



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/626,881	07/25/2003	Il-kwon Moon	277/014	1045
27849	7590	09/29/2005		
LEE & MORSE, P.C. 1101 WILSON BOULEVARD SUITE 2000 ARLINGTON, VA 22209			EXAMINER THOMPSON, TIMOTHY J	
			ART UNIT 2873	PAPER NUMBER

DATE MAILED: 09/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/626,881

Applicant(s)

MOON ET AL.

Examiner

Timothy J. Thompson

Art Unit

2873

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5-11 is/are allowed.
- 6) ☒ Claim(s) 1-3, 18 and 19 is/are rejected.
- 7) ☒ Claim(s) 4, 12-17 and 20-24 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 03/2005,
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 18, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koops et al.(U.S. Pat. No. 5,973,823) in view Kozhukh (U.S. Pat. No. 6,940,577).

Regarding claims 1, 18, 19, Koops et al. discloses a photonic crystal including a material that is capable of varying its refractive index in accordance with an electric field(col 4, lines 19-28), the photonic crystal having a photonic bandgap in a specific frequency range(col 3); and an upper transparent electrode and a lower transparent electrode arranged on an upper side and a lower side of the photonic crystal(fig 1, 8), respectively, to which a voltage is applied, wherein a size of the photonic bandgap of the photonic crystal is controlled by the voltage applied between the upper electrode and the lower electrode(col 3, lines 20-48). Koops et al. does not disclose the upper and lower electrodes are transparent, infact Koop et al. does not disclose if the electrodes are opaque or transparent. However, Kozhukh discloses transparent electrodes with a light modulator(col 1, lines 15-30). It would have been obvious to one skilled in the art at the time of the invention to use transparent electrodes as shown by Kozhukh, in the light

modulator of Koops et al., since as shown by Kozhukh transparent electrodes are commonly used for driving light modulators.

Regarding claim 2, Koops et al. discloses a reflection amount of visible light reflected in a specific frequency range from the photonic crystal is variable based on an electric field applied to the photonic crystal(col 3, lines 20-48).

Regarding claim 3, Koops et al. discloses a penetration amount of visible light penetrated in a specific frequency range from the photonic crystal is variable based on an electric field applied to the photonic crystal(col 3, lines 10-21).

Allowable Subject Matter

Claim 4, 12-17, 20-24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 5-11 are allowed.

The following is an examiner's statement of reasons for allowance: The prior art taken either singularity or in combination fails to anticipate or fairly suggest the limitations of the independent claim, in such a manner that a rejection under 35 U.S.C. 102 or 103 would be proper. The prior art fails to teach a combination of all the claimed features as

Art Unit: 2873

presented in independent claims 5 with the allowable feature being includes a plurality of photonic crystals including a material that is capable of varying its refractive index in accordance with an electric field, each of the plurality of photonic crystals having a photonic bandgap in a different frequency range. Therefore claim 5-11 are allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy J. Thompson whose telephone number is (571) 272-2342. If the examiner can not be reached his supervisor, Georgia Epps, can be reached on (571) 272-2328.

T.J.T.

9/23/05


TIMOTHY THOMPSON
PRIMARY EXAMINER